

**Abstract of the Disclosure**

Systems and methods for assessment of tissue properties, noninvasively, by acquiring data relating to at least one aspect of intrinsic and/or induced tissue displacement, or associated biological responses, are provided. Data relating to tissue displacement and associated biological changes may be acquired by detecting acoustic properties of tissue using ultrasound interrogation pulses, preferably in a scatter or Doppler detection mode. Based on this data, tissue properties are assessed, characterized and monitored. Specific applications for systems and methods of the present invention include non-invasive assessment and monitoring of intracranial pressure (ICP), arterial blood pressure (ABP), CNS autoregulation status, vasospasm, stroke, local edema, infection and vasculitis, as well as diagnosis and monitoring of diseases and conditions that are characterized by physical changes in tissue properties. Methods and systems for localizing physiological condition(s) and/or biological response(s), such as pain, by targeting and selectively probing tissues using the application of focused ultrasound are also provided.

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